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(6) ANALYSIS OF JOB PERFORMANCE RATINGS OBTAINED IN REENLISTMENT STUDY.

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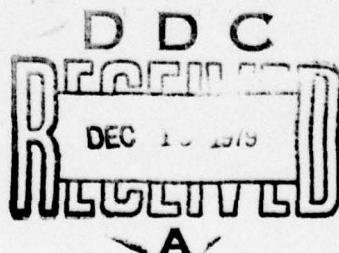
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ANALYSIS OF JOB PERFORMANCE RATINGS OBTAINED IN REENLISTMENT STUDY

Ratings have had wide use in the assessment of job performance in a variety of military situations. They provide a means of obtaining performance information on large numbers of men over a broad range of activities in a relatively economical manner. [In order to make maximal use of current rating information and to improve the quality of future ratings, more information about factors in job performance ratings is needed. The purpose of the present study was to utilize existing ratings to obtain partial information about some of these factors. The study was pointed toward four specific objectives:

1. to determine the extent of differences in ratings by supervisors and peers,

2. to estimate the structure of ratings on several aspects of performance,

3. to estimate the relationship between ratings and (a) frequency of observation by the rater and (b) length of time rater had worked with or supervised ratee, and

4. to estimate the relationship between ratings and background and attitudinal variables.

METHOD

SAMPLE

The ratee group consisted of 433 RA personnel from samples obtained for the follow-up study of reenlistment intention (project NCT b-14). All cases had been in the Army approximately one year at the time of the ratings and were assigned to a wide range of combat and technical MOS. All ratees were single Caucasian males in their late teens or early twenties. They had a mean ACB verbal standard score of 111.13 and 61% had completed high school.

RATINGS

Each ratee was rated by his immediate supervisor and two peers on a 17-item scale (PT 3725). The items covered social, proficiency, productivity, and military aspects of the man's performance, as well as overall evaluations. For each item, three to six graded response categories were provided. The scale is given in Appendix A.

In general, raters indicated daily observation of the ratees' performance (Item 19) and had worked with or supervised the man for approximately six months (Item 20).

VARIABLES

1-19. Supervisor responses to items in PT 3725

    1-17. rating items
    19. frequency of observation
    20. length of time rater supervised ratee

20-38. Peer responses (Group P-1) to items in PT 3725

    1-17. rating items
    19. frequency of observation
    20. length of time rater worked with ratee

39-57. Peer responses (Group P-2) to items in PT 3725

    1-17. rating items
    19. frequency of observation
    20. length of time rater worked with ratee

58. Year of birth (Item 5, PT 3724)

59. Reenlistment Intention. Item 17, PT 3724

60. Attitude toward Army. Sum of items 41 through 53, PT 3724: Agree = 2, ? = 1, Disagree = 0.

61. Education. A dichotomy of completed high school (code 1) versus noncompletion (Code 0).

62. ACB Verbal Test score. Standard score from administration of ACB at entry into service.

63. Rural-Urban Key. An 8-item key from PT 3426, administered at entry into service.

64. Socio-economic Key. A 37-item key from PT 3426, administered at entry into service. Larger scores indicate higher socio-economic level.

Table 1

MEANS AND STANDARD DEVIATIONS OF INDIVIDUAL RATING ITEMS FOR EACH RATER GROUP

| | Rater Group | | | | | Rater Group | | |
Item	Supervisors	Peer Group 1	Peer Group 2	Item	Supervisors	Peer Group 1	Peer Group 2
1	2.44 .53	2.46 .53	2.42 .53	10	4.00 .94	4.05 .96	3.89 .82
2	2.48 .53	2.49 .52	2.47 .52	11	2.17 .53	2.22 .54	2.14 .51
3	2.42 .63	2.44 .61	2.40 .61	12	2.16 .69	2.17 .66	2.06 .66
4	2.47 .56	2.45 .55	2.37 .55	13	2.58 .59	2.59 .55	2.57 .56
5	2.27 .61	2.39 .58	2.37 .61	14	2.58 .53	2.63 .53	2.57 .55
6	2.22 .54	2.38 .55	2.32 .56	15	2.56 .55	2.56 .54	2.49 .57
7	2.00 .29	2.05 .31	2.00 .24	16	3.86 .92	3.98 .98	3.74 .87
8	2.34 .57	2.39 .56	2.38 .56	17	3.88 1.10	4.16 1.13	3.71 1.10
9	2.51 .61	2.55 .59	2.47 .59				

ANALYSIS

The sets of ratings for each man obtained from the two peers were assigned, one to rater group P-1, and one to rater group P-2, in a non-systematic manner. All variables were intercorrelated (product-moment--uncorrected for course grouping, point-biserial, or phi coefficients, depending upon number of scoring categories) and means and standard deviations were obtained. A 34-variable sub-matrix of rating items (1-17 rated by supervisor and 1-17 by one peer rater group) was factored by successive application of a technique described by Wherry (1959). Rater group P-1 was chosen as the peer group to be used in the factor analysis on the basis of the flip of a coin. All supervisor and all peer (P-1) ratings were used as clusters and the factorization carried out. A residual matrix was obtained and factored by the same method (different initial clusters). The method yielded a hierarchial solution and no rotation was done. The intercorrelation matrix is given in Table 1, and the factor matrix in Table 2, Appendix B.

RESULTS AND DISCUSSION

DIFFERENCES IN RATINGS MADE BY SUPERVISORS AND PEERS

The mean and standard deviation of each rating item for each rater group are given in Table 1. In general, the differences between peer and supervisor groups appeared no greater than differences between the two peer groups. In terms of level and variation of ratings, there was no real evidence on which to posit supervisor-peer differences. Differences in the pattern of coefficients representing magnitudes of relationship among rating items for the three rater groups were not subjected to statistical analysis. Within-group intercorrelations were uniformly larger than corresponding between-group coefficients, but this was to be expected since within a given group for a given ratee all ratings items were responded to by one rater. It would be unlikely that inter-rater agreement would be greater than intra-rater agreement. From the factor analysis, the same dimensions appeared to characterize both supervisor and peer ratings.

STRUCTURE OF THE RATINGS

The intercorrelation and factor matrices are given in Appendix B. Eleven orthogonal factors were obtained from the 34-variable matrix of supervisor and peer ratings. In general, the rating item interrelationships seems to be a function of an overall global evaluation (Factors I, II, and III), plus evaluations on dimensions of job knowledge (Factors IV, V, and VI), military behavior (Factors VII, VIII, and IX), and interpersonal relations (Factor X). Factor XI picks up loading from both peer and supervisor ratings on how important the man is to his unit. Six of the eleven factors reflect the greater consistency within rater type than between rater type.

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Table 2

CORRELATION COEFFICIENTS BETWEEN FREQUENCY OF OBSERVATION AND LENGTH OF RELATIONSHIP AGAINST
RATINGS FOR EACH RATER GROUP

Rating Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
						Frequency of Observation											
Ratings by Supervisors	05	06	08	04	-07	00	-02	00	07	06	01	01	03	08	08	04	08
Peer Grp P-1	19	17	08	12	07	09	03	13	14	11	13	12	16	13	15	12	18
Peer Grp P-2	15	15	14	07	09	18	00	18	12	13	13	16	12	22	15	15	17
						Length of Time Worked with or Supervised Ratee											
Ratings by Supervisors	07	04	07	10	08	11	00	09	00	04	05	06	00	04	06	04	10
Peer Grp P-1	03	08	02	04	10	04	02	13	01	06	08	07	02	07	05	07	07
Peer Grp P-2	02	07	07	02	17	05	05	11	07	02	09	11	08	01	06	05	06

Table 3

CORRELATION COEFFICIENTS FOR BACKGROUND AND ATTITUDINAL VARIABLES AGAINST RATINGS FOR EACH RATER GROUP

Rating Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Age																	
Ratings by Supervisor	14	09	11	15	13	11	10	09	13	10	10	18	10	20	15	16	17
Peer Grp P-1	10	18	20	21	12	22	03	16	09	18	13	22	11	18	14	15	21
Peer Grp P-2	12	17	18	12	22	21	03	17	14	18	12	19	14	25	15	13	14
Education																	
Supervisor	15	16	19	16	11	10	07	09	13	11	12	17	15	17	19	14	19
Peer Grp P-1	10	17	13	10	08	13	04	12	12	17	15	16	18	19	15	19	20
Peer Grp P-2	16	09	18	11	12	16	03	11	14	18	16	17	22	22	16	17	16
Socio-Economic Level																	
Supervisor	00	06	01	03	07	06	02	00	09	03	01	04	01	01	02	08	03
Peer Grp P-1	02	01	04	06	03	02	02	05	05	08	05	07	08	08	01	08	05
Peer Grp P-2	01	07	02	04	04	05	04	01	08	02	03	03	01	08	10	05	03
Rural Vs. Urban Bkg.																	
Supervisor	05	06	07	08	07	05	07	04	09	11	05	03	00	01	02	02	03
Peer Grp P-1	03	05	05	01	10	02	02	02	03	01	08	08	05	01	08	08	03
Peer Grp P-2	01	03	01	05	02	01	03	05	01	08	01	01	02	03	04	02	04
Attitude Towards Army																	
Supervisor	03	02	03	05	13	00	06	09	10	11	06	05	07	06	07	09	08
Peer Grp P-1	01	08	05	08	07	08	03	06	03	03	02	03	04	01	04	02	07
Peer Grp P-2	05	02	07	11	05	08	03	11	04	06	06	11	03	06	06	07	10
Reenlistment Intention																	
Supervisor	02	02	03	01	08	00	02	03	08	03	00	02	02	05	01	04	03
Peer Grp P-1	06	02	05	03	01	08	01	02	00	08	03	06	05	03	05	03	01
Peer Grp P-2	00	05	07	04	13	07	06	05	11	06	06	07	02	04	08	13	13

RATINGS VS OTHER VARIABLES

Frequency of observation and length of time rater worked with or supervised ratee. The data bearing on this relationship are given in Table 2. Coefficients were uniformly low. Relationships between frequency of observation and ratings tended to be of somewhat greater magnitude for the peer rater groups. Since the coefficients were almost all positive across rating items, they may reflect some tendency on the part of peer raters to up-grade ratees with whom they work more closely.

Background and attitudinal variables. Coefficients representing relationships among background and attitudinal variables and ratings are given in Table 3. Age and education yielded consistently larger coefficients than the other variables, but were of relatively small magnitude. As an estimate of the efficiency of the background and attitudinal variables as predictors of performance ratings, the correlation of the optimally weighted set of variables listed in Table 3 was correlated against item 10 (an overall evaluation) ratings by peers in group P-2. The R was .25. Considering that this is a back validity and typical of R's against other items as criteria, the practical value of these background and attitudinal variables for predicting performance ratings seems, at best, limited.

CONCLUSIONS

From the analysis of ratings in this study, differences between supervisor and peer ratings appear to be negligible. Background, attitudinal, and rater observation variables were found to have limited predictive effectiveness. Other than a general factor and rater factors, three dimensions appeared in the analysis: job knowledge, military behavior, and interpersonal relations. More controlled and intensive study is needed to obtain information on a variety of problems in the use of rating data as assessment of job performance.

REFERENCE

Wherry, R. J. Hierarchical factor solutions without rotation.
Psychometrika. 24, 1959, 45-52.

APPENDIX A

Rating Items

1. HOW DOES HE GET ALONG WITH THE PEOPLE HE HAS TO WORK WITH?
   A. He is quite popular with them ....
   B. He gets along reasonably well with them.........................
   C. He is quite unpopular with them................................

2. HOW IMPORTANT IS HE TO HIS UNIT?
   A. It would be hard to get a replacement for him who would be as good as he is...
   B. He could be easily replaced....................................
   C. The unit would be better off without him.......................

3. HOW WELL DOES HE MASTER NEW DUTIES?
   A. He learns things fast...
   B. He keeps up with the group.....................................
   C. He learns things slowly..

4. HOW PRODUCTIVE IS HE?
   A. He does more than his share of the work.........................
   B. He does no more and no less than is required of him..............
   C. It is difficult to get any work out of him.......................

5. HOW WELL DOES HE KNOW HIS JOB?
   A. He knows everything about his job that he has to know...........
   B. He is a little weak on some of the things he ought to know......
   C. He has a lot to learn to reach a satisfactory level.............

6. HOW MUCH SUPERVISION DOES HE NEED?
   A. He can be depended on to do all his work without supervision....
   B. He needs some supervision......................................
   C. He has to be watched all the time..............................

7. HOW CAREFUL IS HE IN HIS WORK?
   A. He doesn't make any mistakes....................................
   B. He makes some mistakes, but nothing serious.....................
   C. He is very careless and sloppy in his work......................

8. HOW WELL IS HE QUALIFIED FOR HIS JOB?
   A. Very well...
   B. Reasonably well..
   C. He doesn't have the necessary skills and abilities for his job.

9. IN GENERAL, HOW IS HE GETTING ALONG ON HIS JOB?
   A. Very well for a man of his experience.............................
   B. As well as can be expected of a man of his experience............
   C. He is not working up to expectations for a man of his
      experience...

10. CONSIDERING EVERYTHING, HOW WOULD YOU RATE HIM ON HIS USEFULNESS
    TO THE ARMY ON HIS PRESENT JOB?
    A. HE IS THE VERY BEST TYPE OF WORKER...............................
       He is above average in every way as a worker and is superior
       in most ways.
    B. HE IS AN OUTSTANDING TYPE OF WORKER..............................
       He is very good in most ways as a worker.
    C. HE IS A GOOD TYPE OF WORKER......................................
       He takes his work seriously and does the best he can at all
       times.
    D. HE IS AN ACCEPTABLE TYPE OF WORKER...............................
       He doesn't always do the best he can, but he has no serious
       weaknesses as a worker.
    E. HE IS AN UNSATISFACTORY TYPE OF WORKER...........................
       He seems to be out of place on his job.
    F. HE IS THE VERY WORST TYPE OF WORKER..............................
       He is definitely out of place on his job.

11. HOW DOES HE COMPARE WITH OTHERS IN THE UNIT IN GENERAL MILITARY
    ACTIVITIES SUCH AS MARCHING, INSPECTIONS, AND BIVOUACS?
    A. He is one of the best in the unit...............................
    B. He gets along all right...
    C. He is not very good in this respect.............................

12. HOW WOULD HE COMPARE WITH OTHERS IN THE UNIT IF HE HAD TO TAKE THE
    LEAD IN AN EMERGENCY?
    A. Very well...
    B. About the same as most..
    C. Not very well...

13. HOW WOULD YOU RATE THIS MAN ON HIS MILITARY APPEARANCE AND BEARING
    IN COMPARISON WITH OTHERS IN THE UNIT?
    A. He creates a good impression....................................
    B. He creates a so-so impression...................................
    C. He creates a poor impression....................................

14. HOW RELIABLE AND TRUSTWORTHY IS HE?
    A. You can depend on what he says at all times.....................
    B. You have to check up on him once in a while....................
    C. You can't depend on what he says most of the time..............

15. WHAT EFFECT DOES HE HAVE ON THE UNIT?
    A. He has a good effect on the unit................................
    B. He doesn't affect the unit one way or another...................
    C. He has a bad effect on the unit................................

16. CONSIDERING EVERYTHING, HOW WOULD YOU RATE THIS MAN GENERALLY ON HIS
    QUALITIES AS A SOLDIER?
    A. HE IS THE VERY BEST TYPE OF SOLDIER.............................
        He rates high on all the qualities of a soldier.
    B. HE IS AN OUTSTANDING TYPE OF SOLDIER............................
        He rates high on most of the qualities of a soldier.
    C. HE IS A GOOD TYPE OF SOLDIER....................................
        He takes his military duties seriously and tries to live
        up to them at all times.
    D. HE IS AN ACCEPTABLE TYPE OF SOLDIER.............................
        He doesn't take his military duties seriously at all times,
        but has no serious weaknesses as a soldier.
    E. HE IS AN UNSATISFACTORY TYPE OF SOLDIER.........................
        He seems to be out of place in the Army.
    F. HE IS THE VERY WORST TYPE OF SOLDIER............................
        He doesn't belong in the Army at all.

17. CONSIDERING EVERYTHING, HOW WOULD YOU RATE THIS MAN ON HIS GENERAL
    VALUE TO THE ARMY IF HE DECIDED TO BE AN ARMY CAREER MAN?
    A. HE WOULD BE THE VERY BEST TYPE OF CAREER MAN....................
        He would be an asset to the Army in every respect.
    B. HE WOULD BE AN OUTSTANDING TYPE OF CAREER MAN...................
        He would be an asset to the Army in most respects.
    C. HE WOULD BE A GOOD TYPE OF CAREER MAN...........................
        He would have something to offer to the Army and would be
        difficult to replace.
    D. HE WOULD BE A SATISFACTORY TYPE OF CAREER MAN...................
        He would have something to offer to the Army but could be
        easily replaced.
    E. HE WOULD BE AN UNSATISFACTORY TYPE OF CAREER MAN...............
        He would have very little to offer to the Army.
    F. HE WOULD BE THE VERY WORST TYPE OF CAREER MAN..................
        He would do more harm than good in the Army.

APPENDIX B

FACTOR DATA

Table 1 - Part 1

INTERCORRELATIONS AMONG SUPERVISOR RATINGS ON 17 ITEMS

Intercorrelations

	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17
S1	_1_																
S2	43	_2_															
S3	40	45	_3_														
S4	44	54	53	_4_													
S5	34	43	43	34	_5_												
S6	37	40	45	43	49	_6_											
S7	30	27	34	30	37	39	_7_										
S8	41	54	52	45	57	47	30	_8_									
S9	47	51	55	55	40	43	36	50	_9_								
S10	46	58	56	59	50	54	36	59	61	_10_							
S11	39	37	41	38	28	38	29	33	43	48	_11_						
S12	43	52	58	53	40	44	33	49	51	56	53	_12_					
S13	48	49	49	46	38	35	34	43	54	52	48	58	_13_				
S14	42	41	40	47	39	42	26	40	43	47	32	45	46	_14_			
S15	52	58	50	57	35	37	31	46	56	56	45	61	60	45	_15_		
S16	52	56	54	58	44	52	36	54	56	75	59	62	58	52	57	_16_	
S17	51	63	53	55	44	47	32	53	52	70	55	65	58	53	61	77	_17_

Table 1 - Part 2

INTERCORRELATIONS AMONG PEER RATINGS ON 17 ITEMS

Intercorrelations

	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17
P1	_1_																
P2	42	_2_															
P3	33	40	_3_														
P4	43	48	44	_4_													
P5	27	42	36	36	_5_												
P6	35	42	44	40	41	_6_											
P7	24	29	34	24	35	29	_7_										
P8	31	51	47	45	51	42	29	_8_									
P9	29	46	43	46	42	42	29	49	_9_								
P10	40	55	55	58	50	48	35	58	53	_10_							
P11	38	38	40	43	28	36	24	40	42	48	_11_						
P12	41	50	58	54	39	48	29	47	51	57	58	_12_					
P13	35	47	47	43	35	42	29	44	43	52	53	56	_13_				
P14	37	46	43	47	41	48	28	44	55	51	40	54	49	_14_			
P15	42	57	48	53	35	36	25	44	49	55	49	58	63	52	_15_		
P16	43	51	52	55	38	44	36	49	50	72	59	61	59	51	59	_16_	
P17	47	58	56	56	45	50	36	54	51	73	53	67	60	54	61	76	_17_

Table 1 - Part 3

CORRELATIONS AMONG SUPERVISOR - PEER RATINGS ON 17 ITEMS

P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17
35	33	30	34	32	26	14	35	36	40	30	36	35	32	37	38	44
27	43	35	36	32	30	16	33	41	37	29	39	33	32	40	36	44
18	31	41	24	31	27	15	31	36	32	26	35	34	26	35	30	40
26	37	34	37	33	29	17	31	41	37	29	37	30	35	35	34	38
11	20	29	21	32	15	10	32	23	26	20	28	24	18	26	25	30
13	21	23	24	25	28	16	26	23	29	17	27	22	19	26	20	31
12	14	21	22	26	17	21	18	28	23	29	26	26	25	22	24	21
21	34	31	32	29	21	11	37	32	34	32	37	31	26	37	33	39
30	37	33	34	28	30	21	31	41	36	27	35	36	32	45	35	44
28	39	34	39	34	27	17	39	43	44	36	37	32	33	40	43	46
21	28	24	24	23	26	15	26	27	30	39	32	36	22	32	36	33
22	35	38	27	24	28	13	33	34	33	31	38	32	28	37	35	38
26	30	35	35	29	24	17	30	36	36	34	41	48	34	42	43	47
24	33	30	35	26	30	15	31	38	37	27	39	36	37	46	37	39
30	35	39	36	29	32	17	34	38	39	31	41	37	33	40	39	44
24	39	32	39	31	33	14	40	42	45	40	39	40	34	42	47	46
24	40	37	37	28	28	12	40	40	44	35	40	36	33	41	46	45

SUMMARY OF FACTOR ANALYSIS

Table 2

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	h^2
S1	54	34	05	08	05	01	03	08	07	35	09	56
S2	58	40	03	05	05	03	00	02	03	03	31	60
S3	55	43	02	12	15	06	04	06	06	08	05	55
S4	57	41	01	00	01	01	01	06	09	02	10	52
S5	45	30	05	25	41	01	00	04	01	03		55
S6	46	33	06	11	32	01	04	06	04	03	01	45
S7	38	21	01	12	25	07	02	01	02	06	13	29
S8	55	31	01	16	38	01	07	03	07	01	22	63
S9	59	42	01	03	11	00	05	05	00	11	03	56
S10	65	47	01	04	15	03	12	14	00	03	04	71
S11	49	28	00	06	06	04	25	35	04	09	06	53
S12	58	46	04	00	04	06	08	18	02	05	02	60
S13	59	40	03	05	01	08	10	09	04	05	03	54
S14	54	34	05	02	00	02	00	01	01	04	04	41
S15	60	42	02	03	04	03	00	04	03	15	07	57
S16	66	48	01	06	04	07	24	38	10	03	01	89
S17	65	48	02	04	00	16	20	31	06	02	15	84
P1	44	03	34	08	08	00	02	06	09	27	08	41
P2	58	01	38	04	05	04	01	02	01	03	29	57
P3	57	01	37	10	01	18	06	02	03	06	08	52
P4	57	00	38	03	02	01	00	01	07	10	01	49
P5	50	03	22	20	04	38	15	07	03	03	06	52
P6	50	02	27	10	05	25	05	08	06	00	06	41
P7	33	06	22	17	00	30	07	13	13	07	02	32
P8	57	01	27	17	04	30	03	07	05	00	05	53
P9	58	05	25	07	02	05	18	05	03	06	10	46
P10	66	02	44	06	05	02	08	05	20	04	04	69
P11	54	00	26	01	18	02	06	08	24	04	06	46
P12	64	00	42	05	03	02	02	04	19	06	01	63
P13	59	01	39	00	08	00	03	00	12	05	05	53
P14	56	03	40	02	07	06	14	08	04	00	02	51
P15	63	03	38	03	04	01	03	01	10	00	14	58
P16	66	02	44	01	19	04	05	01	32	06	01	78
P17	70	01	44	04	07	02	03	02	31	01	07	79

APPENDIX B

Table 3

DISTRIBUTION OF RESIDUALS[a]

Residual Value	Frequency
09	5
08	3
07	5
06	11
05	17
04	27
03	36
02	61
01	65
00	71
-01	68
-02	57
-03	55
-04	32
-05	17
-06	19
-07	7
-08	3
-09	2
	$\Sigma f = 561$

[a] Residual matrix available from Project Director, New Classification Techniques, f-11.